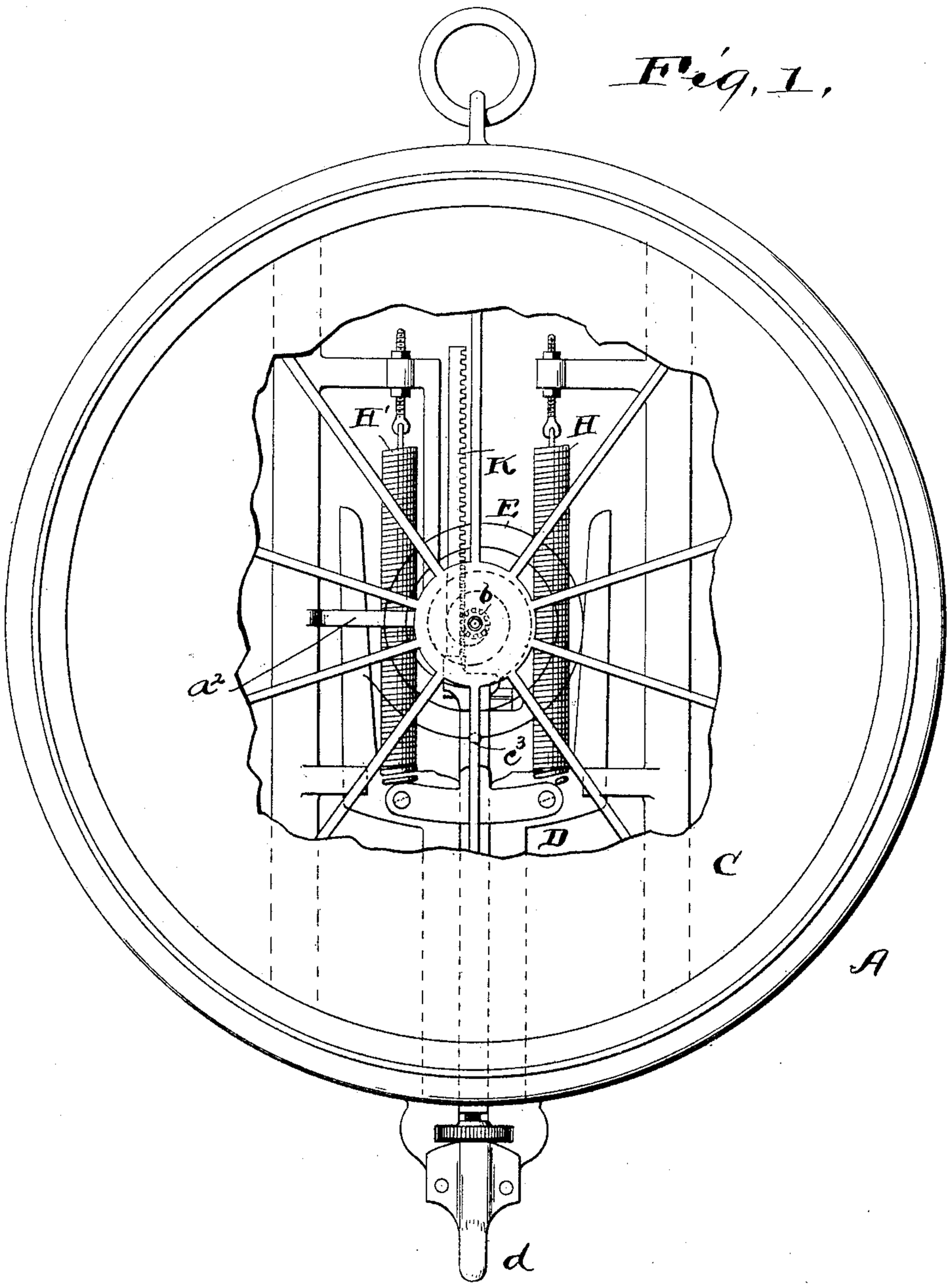
(No Model.) 2 Sheets—Sheet 1.

J. H. SWIHART.

SCALE.

No. 603,415. Patented May 3, 1898.

Fig. 1.



Witnesses.
E. B. Gilchrist
A. M. Rankin

Inventor.
John Henry Swihart,
By his Attorneys,
Thurston & Bates.

(No Model.) 2 Sheets—Sheet 2.

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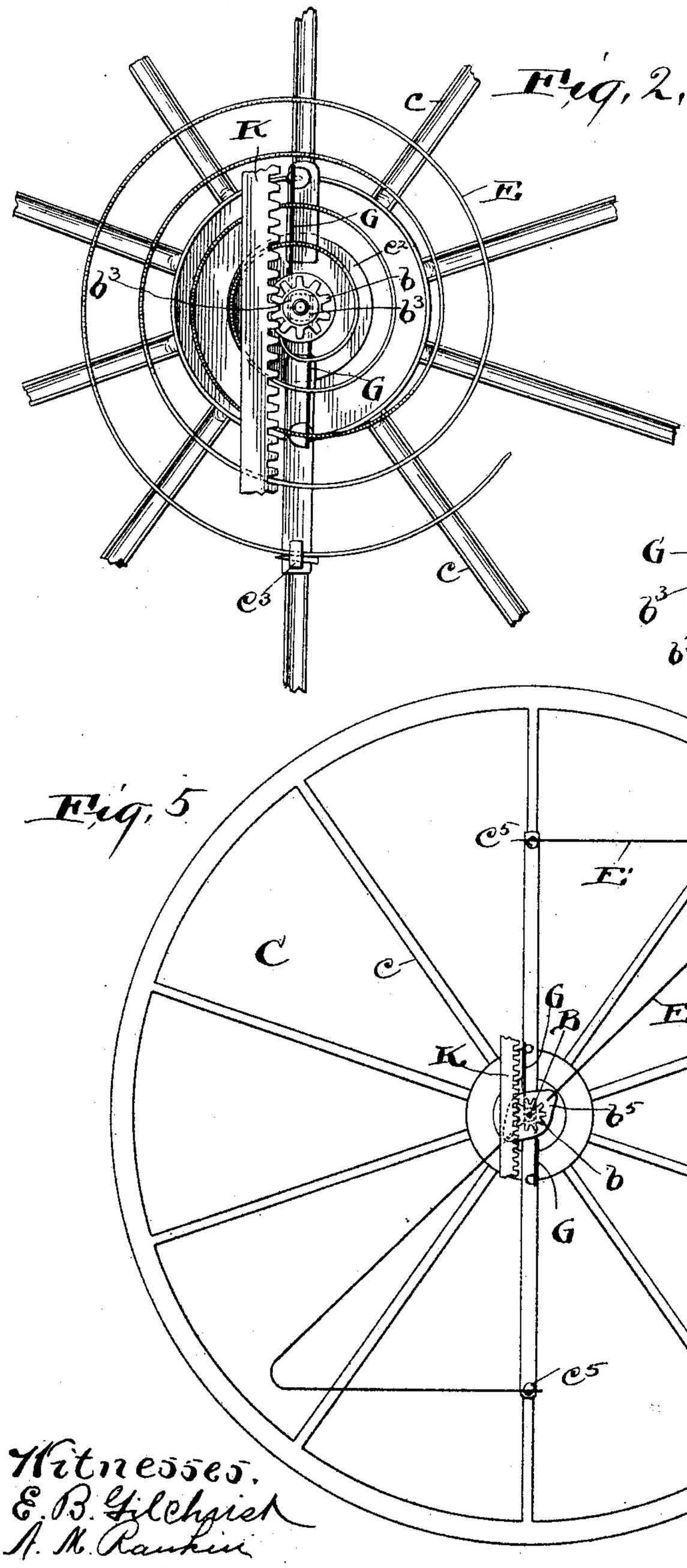

Fig. 2.

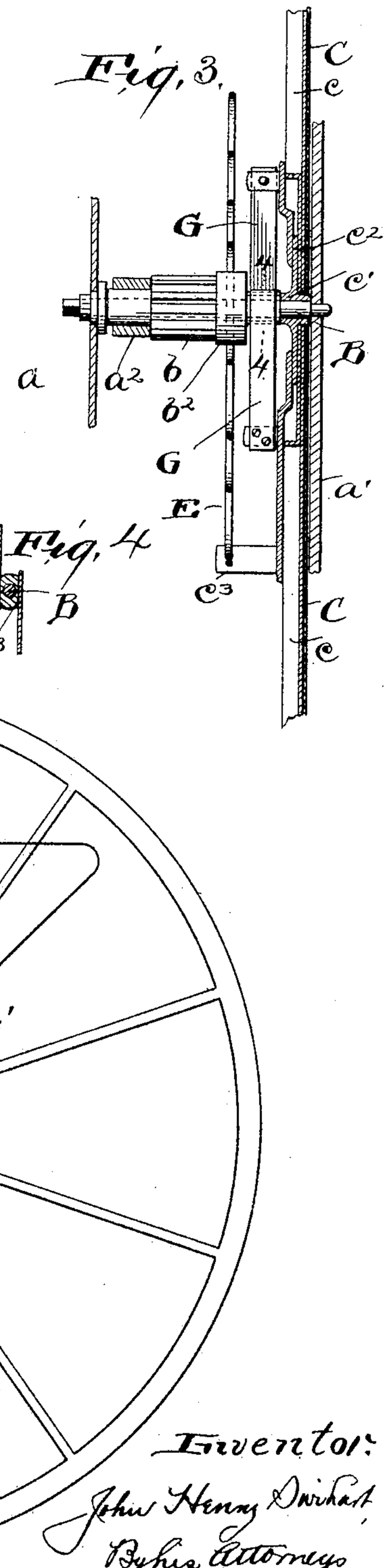

Fig. 3.

Fig. 4

Fig. 5

Witnesses.
E. B. Gilchrist
A. M. Rankin

Inventor:
John Henry Swihart,
By his Attorneys,
Thurston & Bates.

UNITED STATES PATENT OFFICE.

JOHN HENRY SWIHART, OF CLEVELAND, OHIO, ASSIGNOR TO THE NATIONAL COMPUTING SCALE COMPANY, OF SAME PLACE.

SCALE.

SPECIFICATION forming part of Letters Patent No. 603,415, dated May 3, 1898.

Application filed March 13, 1897. Serial No. 627,427. (No model.)

To all whom it may concern:

Be it known that I, JOHN HENRY SWIHART, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a certain new and useful Improvement in Scales; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention is for an improvement particularly applicable to spring-balance computing-scales; and it relates to the connections between a pinion or other form of rotatable scale member which is rotated by the load upon the scale and an axially-mounted but independently-movable indicator, preferably a dial, whereby said two parts, although permitted a limited independent movement, are compelled to come to rest in exactly the same relative positions at all times.

The invention resides in the means substantially as shown, consisting of a spring latching device for compelling said parts to come to rest always in the same relation to each other, in combination with means which permit a limited relative movement of said parts and which return the indicator into approximately the desired position relative to the other independently-movable member, and also in the specific combinations of parts, as described and claimed.

In the drawings, Figure 1 is a front elevation of a spring-balance computing-scale containing my invention, the dial and face-plate being shown as broken away in their middle parts. Fig. 2 is an enlarged rear view of the part of the scale which includes my invention. Fig. 3 is a sectional side view of the parts shown in Fig. 2. Fig. 4 is a sectional view on line 4 4 of Fig. 3, and Fig. 5 is a rear view of a modified construction.

Referring to the parts by letters, A represents the scale-case, which may be of any suitable construction and form.

N represents the rotating spindle, which extends across the case and is suitably journaled, preferably in the front and back plate *a a'* of the case. The sleeve or hub *b* of a pinion B is loosely mounted upon the spindle N and constitutes the most efficient form of the rotatable scale member. A vertically-movable frame D is supported by springs H H', and the load is to be placed upon a scale-pan (not shown) which is hung from a loop *d* on the lower end of said frame, which projects out through the bottom of the case. This frame carries a rack-bar K, which is connected to it in the usual way, and this rack-bar engages with the pinion B. The described mechanism constitutes the best practical means for rotating the rotatable scale member a distance proportionate to the load upon the scale-pan; but any construction adapted to produce this result may be employed in place of that shown and described.

The indicator, as shown, is in the form of a dial, made of paper or other suitable material, which is secured to the dial-frame *c*. This frame is rigidly fastened to the spindle B, and consequently is mounted axially with respect to the pinion.

E represents a spring-retractor which connects the pinion-sleeve *b* and the dial. Its functions are, first, to act as a yielding cushion to prevent sudden shocks to the dial, which result is effected by the yielding of the spring enough to permit the pinion and dial to turn independently; second, to transmit motion from the pinion to the dial, and, third, to move the dial into approximately the proper position relative to the pinion. When the load is gently placed upon or taken from the scale-pan, the pinion is revolved very slowly, and consequently this spring E, assisted by the spring-latch, to be described, transmits motion from the pinion to the dial, wherefore both move together. When the load is suddenly thrown onto or taken from the scale, the pinion moves quickly in one direction or the other independently of the dial, the retractor-spring E yielding to permit this independent movement. This movement of the dial distorts the spring E, which seeks to resume its normal condition, and in so doing rotates the dial until it is brought very near to its normal position relative to the pinion. The spring E (shown in Figs. 1, 2, and 3) is a spiral spring like a watch-spring, and it is firmly attached at its ends respectively to a

collar b^2, fixed to the pinion-sleeve b, and to a stud c^3 on the dial-frame. This spring is adjusted as accurately as possible to return the dial to its proper position relative to the pinion; but it is almost an impossibility to balance any spring so exactly that it will always return the dial to the exact point. This spring acts in both directions, and consequently it loses power to move the dial as the dial nears its proper position. In fact when the dial is in this position the spring has, theoretically, no force at all. The mere friction of the moving parts may prevent this spring from returning the dial to its proper position; but unless the dial always comes to rest in exactly the same position relative to the pinion the scale is practically valueless. It is certainly an exact statement to say that only in a few out of many cases would it be possible to reduce the friction of the parts and also to balance the spring so accurately that it would effect this necessary result, and even in such cases the rough usage to which these scales are subjected would soon throw it out of balance. It is therefore necessary to the practical and accurate working of the scale that means be provided which will cause the dial to come to rest always in the proper position relative to the pinion. This result is effected in the construction shown by a yielding-spring latching device, which, although it must always be under tension, does not sensibly impede the relative movement of the dial and pinion except when this movement is very slow and the parts are in nearly the position in which they should come to rest.

In the construction shown, which is effective and cheap, the latching device consists of two spring-arms G G, which are secured to the dial-frame and bear, respectively, against flat surfaces b^3 b^3, formed on diametrically opposite parts of the pinion-sleeve b. These spring-arms must always be under tension, and, although they always press against the said sleeve with some force, do not, except by their friction upon the sleeve, oppose the relative movement of the dial and pinion. That movement is limited by the spring E, which also acts to return the dial to approximately the proper position. The springs G G when the dial is moving very slowly past its proper position then act against the flat surfaces b^3 b^3 and bring the dial to rest in exactly the proper position.

Instead of the spiral spring E some other form of spring or springs may be used for the described purpose—as, for example, the two flat bent springs E′ E′ may be firmly attached at their inner ends to a collar b^5, fixed to the pinion-sleeve, while the outer ends may be secured to the studs c^5 on the dial-frame c. These springs will yield and permit the independent movement of dial and pinion; but they will compel the dial to move to approximately the position in which it should come to rest relative to the pinion. Any other form of yielding-spring retractor between the dial and pinion may be used, provided it is adapted to act substantially as and with the results specified. The spiral spring shown has, however, certain advantages over any other form of retractor which could be used, because it permits a larger movement of the dial relatively to the pinion than any other form without injury to the spring, while it never jars the dial, but always stops it very gradually. So, also, other forms of yielding-spring latches may be employed without departure from the broad invention as claimed. It is obviously unimportant whether the spring-latch be carried by the dial or pinion, provided it engages with the other of said parts substantially as described.

Having described my invention, I claim—

1. The combination of a rotatable scale member and means for rotating it proportionately to the load, with an independently-rotatable dial mounted in axial line with said member, a yielding-spring retractor connecting said dial and member, and acting to return the dial to approximately its proper relative position, and a yielding-spring latching device carried by the dial or one of said independently-rotatable parts and engaging with the other, and acting to cause the dial to come to rest always in the same position relative to the said member, substantially as specified.

2. The combination of a rotatable scale member and means for rotating it proportionately to the load, with an independently-rotatable dial, a yielding-spring retractor which connects said two parts, and a plurality of spring latching-arms secured to one of them and bearing under constant tension upon a plurality of flattened surfaces on diametrically opposite parts of the other of said parts, substantially as specified.

3. The combination of a rotatable scale member and means for rotating it proportionately to the load, with an independently-rotatable dial in the same axial line with the said member, a spiral spring connected at its ends respectively to the dial-frame and member, and a yielding-spring latching device carried by one of said independently-rotatable parts, and engaging with the other of said parts, whereby the dial is always brought to rest in the same relative position, substantially as specified.

4. In a scale, the combination of a rotatable scale-spindle, an indicator rigidly attached thereto, a pinion loosely mounted upon said spindle, and means for rotating the pinion proportionately to the load upon the scale-pan, a yielding-spring device serving as the connection between the indicator and pinion, and a spring latching device which brings the indicator and pinion to rest in the same relative position at all times, substantially as specified.

5. In a scale, the combination of a rotatable scale member, means for rotating it proportionately to the load, an independently-rotatable indicator in axial line with said member, a yielding spring which is rigidly connected at its ends respectively with the said member and the indicator, and a spring latching device for bringing the member and indicator to rest in the same relative position at all times, substantially as specified.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN HENRY SWIHART.

Witnesses:

E. L. THURSTON,

ALBERT H. BATES.